



Heavy Flavors at the EIC: Brief Report

Xin Dong (LBNL), Stephen Sekula (SMU), and Ivan Vitev (LANL)
Presented at the Energy Frontier Workshop - Restart
Parallel Session G: EF07

Where we left off ...

We collected input from the community in Feb. + March of 2021. We requested from each person/group $\frac{1}{2}$ page of text + figures and references.

- Topics: *heavy flavor mass schemes, quarkonia and exotics, heavy meson tomography of cold nuclear matter, charm jets and intrinsic strangeness, jets as a probe of space-time structure of nuclear matter, open heavy flavor and jet studies, ... see later slides for sample.*
- *In the meantime, the EIC Yellow Report became public.*

Goal: based on TEX/figures/bibliographies, collect into a Snowmass-bound document and circulate for further input, refinement, etc.

Next Step(s): migrate content to Overleaf and begin condensing/editing; invite original contributors to suggest improvements, etc.

Contributors so far ...

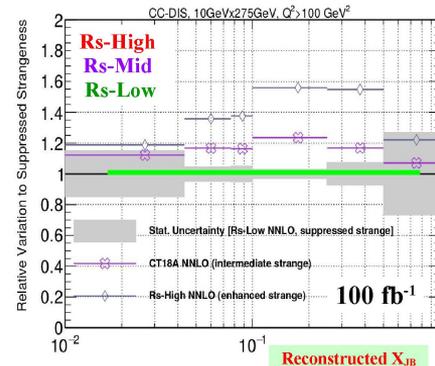
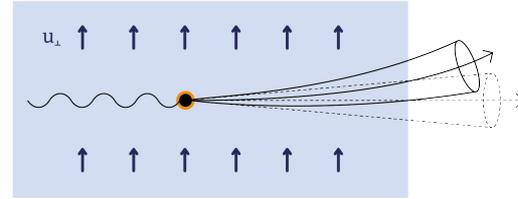
H. Abdolmaleki (IPM), M. Arratia (UC Riverside), Y.-T. Chien (SUNY Stony Brook), X. Dong (LBNL), M. Durham (LANL), Y. Furletova (JLab), M. Garzelli (Hamburg U.), V.P. Goncalves (UFPEl), T. Hobbs (SMU), J. Huang (BNL), Y. Ji (USTC/LBNL), Z. Kang (UCLA), M. Kelsey (LBNL), X. Li (LANL), H.-W. Lin (MSU), M. Liu (LANL), S. Moch (Hamburg U.), P. Nadolsky (SMU), V. Okorokov (NRNU MEPhI), F. Olness (SMU), M. Ploskon (LBNL), S. Radhakrishnan (KSU/LBNL), J. Rojo (Nikhef), I. Schienbien (LPSC), S. Sekula (SMU), D. Shao (UCLA), E. Sichtermann (LBNL), G. Silveira (UFRGS & UERJ), G. Sterman (SUNY Stony Brook), I. Vitev (LANL), K. Xie (SMU), W. Xie (Purdue U.), Z. Ye (UIC)

Collected contributions

- Additional details in their writeup

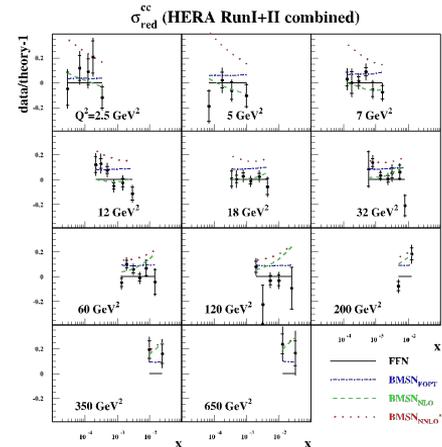
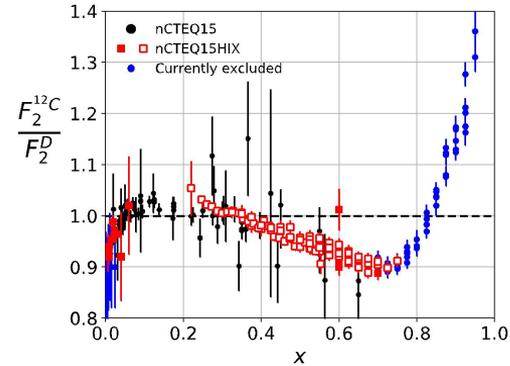
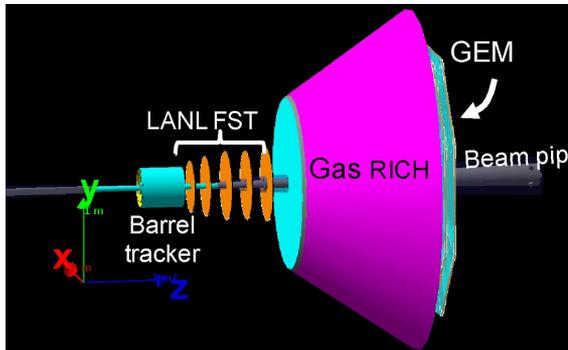
A. Sadofyev, F. Oless, S. Moch, P. Wong, D. Shao, X. Li, Y. Makris, Y. Zhao, Z. Liu

- Density effects on parton propagation in e+A collisions and hadronization
- Charm jets as probes of strangeness at the EIC



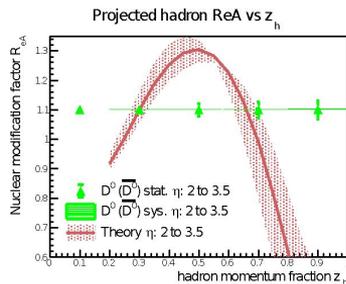
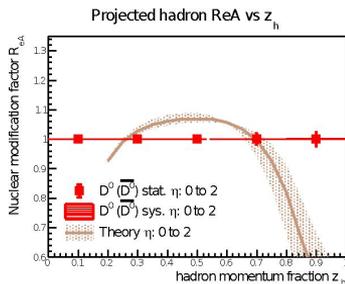
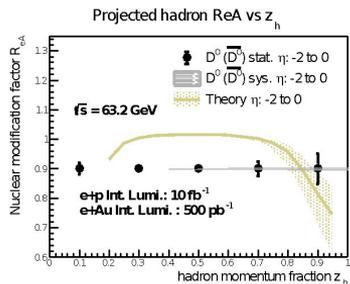
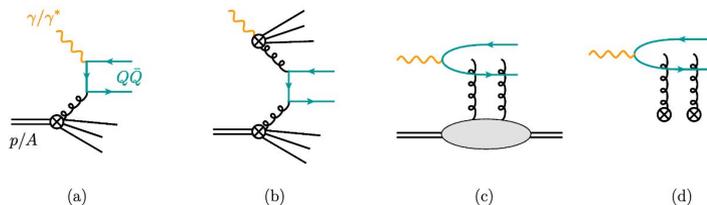
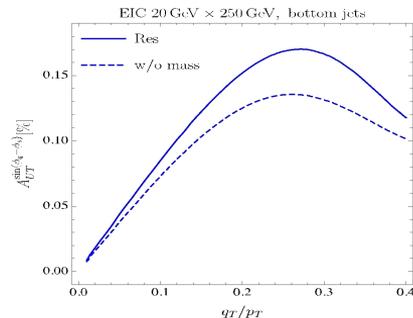
Collected contributions

- Deciphering QCD – nuclear PDFs and nCTEQ
- The Heavy Flavor Schemes at EIC
- A Forward Silicon Tracker for the Future Electron-ion Collider Experiments



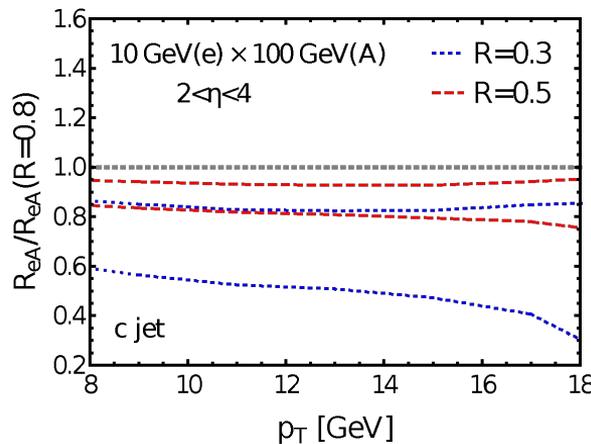
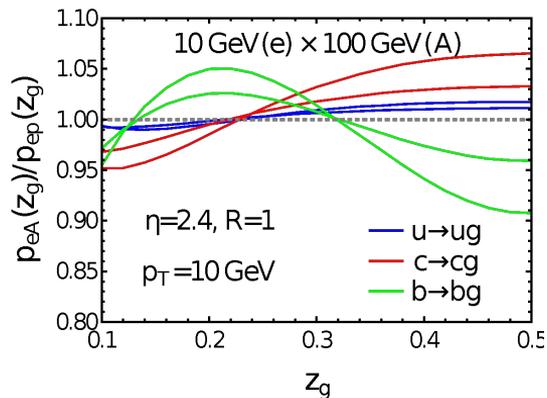
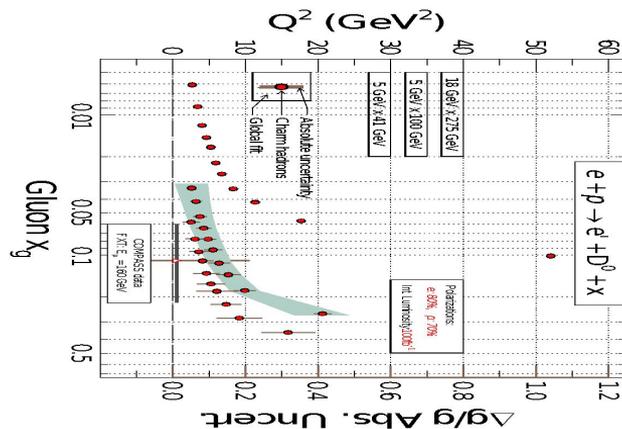
Collected contributions

- Heavy Flavor dijets and the Sivers asymmetry
- Quarkonium production mechanisms at the EIC
- Measurements of heavy flavor mesons and hadronization



Collected contributions

- Gluon $\Delta g/g$ using heavy flavor
- Open heavy flavor mesons in e+A and hadronization
- Heavy flavor jets and jet substructure



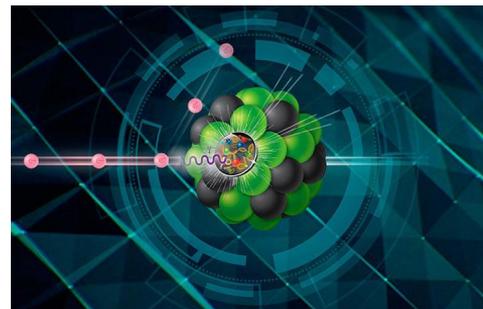


APPENDIX

EIC Opportunities for Snowmass

Heavy Flavor at EIC

X. Dong (LBL), S. Sekula (SMU), I. Vitev (LANL)



The CNFS Workshop

Part of the CNFS workshop organized by:

Abhay Deshpande (SBU), Ciprian Gal (SBU), Swagato Mukherjee (BNL) and Yen-Jie Lee (MIT)

- Monday: EW & BSM Physics
- Tuesday: Hadron Tomography at EIC and HEP
- Wednesday: Jets at EIC
- Thursday: Gluon Saturation at EIC
- Friday: Heavy Flavor at EIC

- Goal: Summarize and document Electron Ion Collider (EIC) related science that have been discussed within the SnowMass2021 process so far.
- An updated and expand version of this document based on the future discussion will become the EIC Proceedings as part of the SnowMass2021 document

Snowmass Delay Official

- A number of large construction projects based on 2014 P5 recommendations are delayed due to COVID-19 pandemic. As a result, the original P5 timeline is relaxed.
- **The Snowmass report will be delayed by one year and the overall schedule for the Snowmass process will be adjusted accordingly.**
- The new Snowmass timeline includes:
 - Preliminary Topical Group Reports – Spring 2022
 - Preliminary Frontier Reports – late Spring 2022
 - Snowmass Community Summer Study – Summer 2022 in University of Washington, Seattle
 - Snowmass Book – October 2022
 - The deadline for contributed papers will be delayed but the specific date will be decided by January 2021. Originally scheduled frontier-level Spring 2021 workshops will be moved to later times.
- Please see the announcement in this wiki page:
<https://snowmass21.org/announcements>

Plan for the Workshop, near term

- Since a large part of the development is connected to the timeline for EIC Yellow Report, we proceed with this important EIC Workshop to take a snapshot of the status
- The new Snowmass schedule could have possible overlap with the preparation for the Nuclear Physics Long Range Plan (timeline unknown)
- Our goal is to finish ~80% of the ground works while take advantage of the new timeline for further developments and updates.

The above information was taken from
Monday's into by Yen-Jie Lee

Heavy Flavor at EIC Lol

- Add any missing contributions
- Ask contributors for ½ page writeup
- Expand the document in the next few months

Important to participate to ensure that the physics is flashed out in those reports

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